

PATENT SPECIFICATION

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(54) SELF-PROPELLED CRUSHING PLANT

(71) We, SOCIETE FIVES LILLE-CAIL, a French body corporate, of 7 rue Montalivet, Paris 8e, France and SOCIETE DES APPAREILS DRAGON, a French body corporate of rue Gabriel Peri, 38-Fontaine, France, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention concerns self-propelled primary crushing plants used in high-output quarries where the working face moves quickly. These plants follow the movement of the working face and are supplied directly by mechanical shovels which collect the material detached from the face, the crushed product being discharged towards fixed installations for further treatment by belt conveyors which are lengthened as the mobile plant moves onwards.

These plants have a crawler-mounted chassis carrying the crusher, the supply hopper and conveyor, the discharge conveyor taking the crushed product and supplying a dumping conveyor which is orientatable and liftable, which is also carried by the chassis, and the driving motors for the crusher, the conveyors and other connected apparatus. The crusher may be of any known type: using jaws, rollers, rigid strikers or articulated hammers, and the motors are generally electric motors supplied by a flexible cable or by a generator carried by the plant.

Since plants of this kind are more economically satisfactory in proportion as they have a higher production capacity, plants with an output greater than 250 t/h and with a total weight exceeding 200 metric tons are generally used.

It is because of their high weight that up to the present time pneumatic-tyred wheels have not been used instead of crawler tracks to support the chassis of such crushing plants, despite the advantage which such use would bring. It has been found impossible to support the entire plant by means of two axles along the distribution of

load between a number of axles greater than two presented technical problems difficult to solve.

The plant of the invention allows pneumatic tyres to be used.

The self-propelled crushing plant according to the invention comprises (a) a crusher, (b) a supply assembly, constituted by a hopper and a conveyor for supplying the crusher, (c) a discharge conveyor for the crushed product, and (d) a chassis consisting of a first chassis part and a second chassis part pivotally connected for relative movement about a horizontal pivotal axis, the first chassis part being supported by a driving axle and a steering axle and carrying the crusher and discharge conveyor, the second part being supported by a single steering axle and supporting, at least during movements of the plant between sites, the lower portion of the supply assembly whose upper portion is pivotably connected to the first chassis part for pivotable movement about an axis parallel to the axis of pivotal connection of two parts of the chassis.

The supply assembly may be connected to the second chassis part by two jacks or other lifting devices permitting of moving this assembly vertically, making it pivot about its pivotable connection.

This arrangement makes it possible to place the hopper at the desired height in order to facilitate the filling of the hopper, and more particularly to make the lower end of the supply assembly rest on the ground, so as to relieve the load on the second chassis part.

The supply assembly may be pivotably connected to a platform placed above the crusher and supporting the driving motors for the supply conveyor, the channel connecting with the crusher and various other elements, this platform being fixed by bolts to a framework fast with the main part of the chassis.

By dismounting this platform and uncoupling the two parts of the chassis, after interposing between the supply assembly and

the second part of the chassis a prop which renders these two parts integral with one another, it is possible to lift the platform to which the supply assembly remains connected and disengage the main chassis, starting-up the shifting motors. It is then possible to have easy access to the crusher and carry out any maintenance or necessary repairs thereto, which is not the case in the mobile self-propelled plants at present in use.

An embodiment of the plant according to the invention will now be described by way of example with reference to the accompanying diagrammatic drawings in which:

Figure 1 is an elevational view of a self-propelled mobile crushing plant, and

Figure 2 shows a half-view of this plant from above.

A first chassis part 10, which constitutes the main part of the chassis, carries the crusher 14, its driving motors 16, the discharge device 18 and its driving motor, and also a platform 20 arranged above the crusher and fixed by bolts to a framework 22 fixed to the chassis. The discharge device 18 is constituted by a conveyor comprising an endless metal apron which passes below the crusher, to discharge the crushed product, and supplies a dumping conveyor 24 mounted on a jib 26 carried by the chassis 10. This jib is orientatable about a vertical axis and adapted to be lifted by means of a system of winch and cables or hydraulic jacks not shown in the drawings. The platform 20 supports a cabin 28 in which are grouped the control elements for all the driving motors for the crusher, the discharge device, the supply system, the driving wheels etc., and the other control apparatus.

The part 10 of the chassis is supported by a driving axle 30 and by a steering axle 32, these two axles being equipped with pneumatic tyres. The two wheels of the steering axle are independent and an elastic suspension is interposed between these wheels and the chassis in order to prevent deformation of the chassis when the plant travels over uneven ground.

On the axle 30 there are preferably used driving wheels each having an incorporated geared motor unit, of the type used in large public works machines. Props 38 permit the chassis part 10 to be propped-up in a fixed position during the operation of the plant, reduce vibrations and take the load off the tyres and suspension.

The second chassis part 12 is connected to the chassis part 10 by a pivotable connection 34 having a horizontal axis and is supported by a steering axle 36 with independent wheels, equipped with pneumatic tyres; an elastic suspension is provided between these wheels and the chassis part 12.

In the embodiment illustrated, the two steering axles 32 and 36 are situated at an equal distance from the driving axle 30, on either side of the latter, but of course it would be possible to place them at different distances.

A servo motor makes it possible to swivel the four wheels of the axles 32 and 36 simultaneously, so that their axes converge at the same point on the axis of the driving axle 30.

The chassis part 12 supports the lower end of a monobloc supply assembly which is connected pivotably to the platform 20 at its upper end.

This supply assembly is constituted by a reception hopper 40 of large capacity to permit supply from lorries if necessary, and a metal apron conveyor 42 used for removing the material from the hopper and supplying the crusher. This assembly is mounted to be pivotable about the shaft 44 of the upper reversal drum of the conveyor 42; the bearings of the shaft and also the geared motor unit driving the conveyor are mounted on the platform 20.

The lower end of the supply assembly is supported by two hydraulic jacks 46 connected pivotably to the chassis part 12. These jacks make it possible to pivot the supply assembly about its pivoting shaft 44 in order to place the hopper at different heights and, more particularly, to bring the lower end of the conveyor, which is provided with shoes 48, to rest on the ground. These jacks 46 could be replaced by other lifting devices, for example a system of cables and winches.

The various components of the plant: the crusher, supply and discharge conveyors, driving wheels, etc., are driven by electric motors which are supplied either from an external source to which the plant is connected by a flexible cable, or from a generator driven by a heat engine carried by the plant.

In operation, the chassis part 10 is propped-up by the props 38 and the shoes 48 rest on the ground. The blocks of material detached from the quarry are loaded into the hopper 40 by mechanical shovels and are brought to the crusher by the conveyor 42. The crusher can be of any desired type, using jaws, rollers, rigid strikers or hammers.

The crushed product falls onto the discharge conveyor apron 18 which supplies the dumping conveyor 24. The latter in its turn supplies bulk conveyors placed on the floor of the quarry, to transport the crushed product to a fixed screening or secondary crushing installation or any other material-treating installation.

When the distance between the working face and the crushing plant becomes too

great owing to the advance of the working face, the plant is moved to another position.

To move the plant, the props 38 are raised, then the supply assembly is lifted by means of the jacks 46. The plant can then be moved by starting-up the motors driving the wheels of the axle 30, and suitably swivelling the steering wheels of the axles 32 and 36 to bring the plant to the new site selected.

The pivotable connections provided between the chassis part 10 and the supply assembly on the one hand and the chassis part 12 on the other hand and the connection provided by the jacks 46 permit vertical displacement of the chassis part 12, which prevents the latter and the chassis part 10 from being subjected to abnormal stresses when the plant moves over broken ground.

After having propped-up the chassis part 10 and made the shoes 48 rest upon the ground, the plant is again ready to operate. The jib 26 is orientated suitably to ensure that the conveyor 24 can supply the bulk conveyor placed on the floor of the quarry, and, if necessary, an element is added to the conveyor in order to lengthen it.

When it is necessary to obtain access to the interior of the crusher in order to carry out maintenance or repair work thereon, the bolts used for connecting the platform 20 and the framework 22 are removed and then the chassis 12 is connected to the supply assembly by means of a tie rod and the platform 20 is lifted by means of a crane.

After dismantling the pivotable connection 34 and opening all the electrical, hydraulic or other connections between the platform 20 and the chassis part 10 on the one hand and between the latter and the chassis 12 on the other hand, the driving motors for the wheels are started-up in order to disengage the chassis part 10.

It is then possible to construct a scaffolding to support the platform 20 and to use the crane to dismount the crusher if necessary. Maintenance and repair are greatly facilitated.

Many modifications may be made to the form of embodiment described, by the use

of equivalent technical means, and it should be understood that all these modifications come within the framework of the invention as defined in the appendant claims. 55

WHAT WE CLAIM IS:—

1. A self propelled crushing plant comprising

a) a crusher, 60

b) a supply assembly, constituted by a hopper and a conveyor for supplying the crusher,

c) a discharge conveyor for the crushed product, and 65

d) a chassis consisting of a first chassis part and a second chassis part pivotally connected for relative movement about a horizontal pivotal axis, the first chassis part being supported by a driving axle and a steering axle and carrying the crusher and discharge conveyor, the second part being supported by a single steering axle and supporting, at least during movements of the plant between sites, the lower portion of the supply assembly whose upper portion is pivotally connected to the first chassis part for pivotable movement about an axis parallel to the axis of pivotal connection of the two parts of the chassis. 70

2. A self-propelled crushing plant as claimed in claim 1, in which the supply assembly is connected to the second chassis part by two hydraulic jacks which permit the lifting of this assembly by making it pivot about its pivotable connection axis. 75

3. A self-propelled crushing plant as claimed in claim 1 or 2, in which the supply assembly is pivotally connected to a platform arranged above the crusher and fixed detachably to a framework fast with the first part of the chassis. 80

4. A self-propelled crushing plant substantially as herein described with reference to the accompanying drawings. 85 90 95

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COMPLETE SPECIFICATION

1 SHEET

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the Original on a reduced scale*

